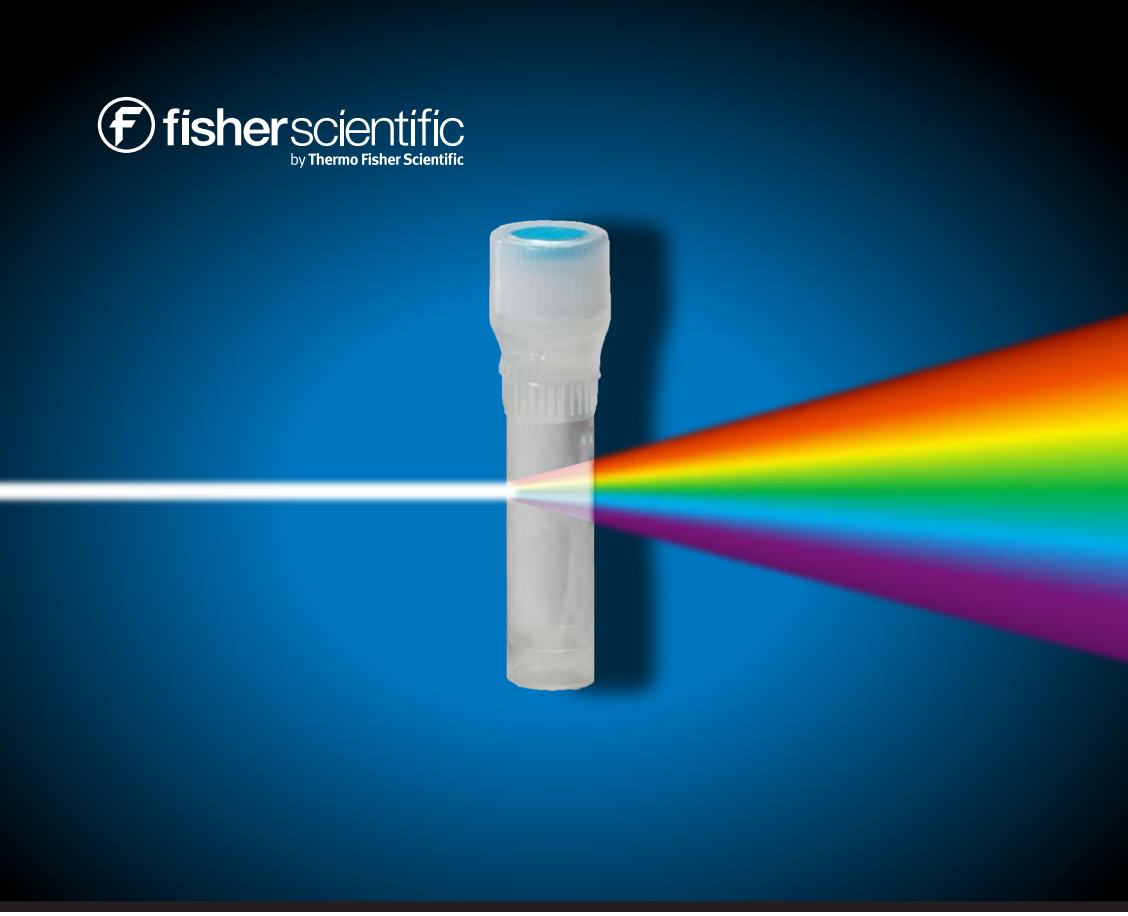
fisherscientific
by Thermo Fisher Scientific



*Trans*IT® Broad Spectrum Transfection Reagents

For more than two decades Mirus Bio has been dedicated to developing reagents that feature high efficiency, low toxicity transfections. The products included in this piece are our most robust transfection reagents that provide solutions to both common and hard-to-transfect cell types, promoting effective workflow in a wide array of applications.

TransIT Certified Transfection

***Trans*IT-X2®**	An advanced system for delivery of plasmid DNA, siRNA/miRNA and CRISPR/Cas9 components
***Trans*IT®-LT1**	An efficient, low toxicity, DNA transfection reagent
***Trans*IT®-2020**	A high performance, animal-free, DNA transfection reagent
***Trans*IT®-mRNA**	A high efficiency, low toxicity transfection reagent for large RNA and CRISPR guide RNA

Delivery by Mirus

Delivery by Mirus

*Trans*IT-X2® Dynamic Delivery System

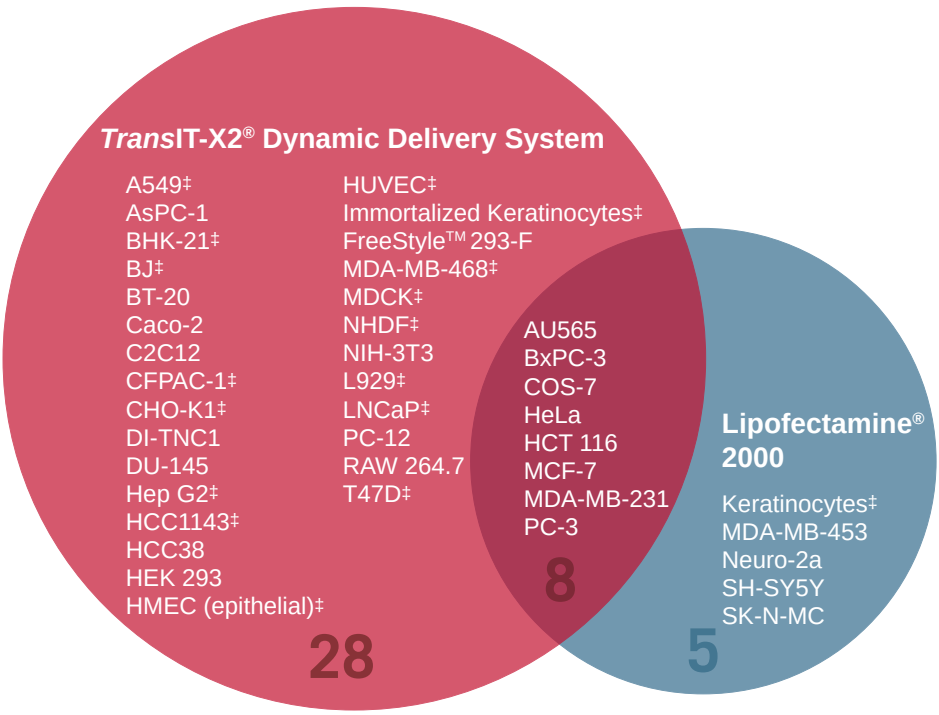
Mirus Bio combines its chemistry and biology expertise to develop cutting edge transfection technologies, like the *Trans*IT-X2® Dynamic Delivery System; an advanced system for delivery of plasmid DNA, siRNA/miRNA, and CRISPR/Cas9 components.

- Exceptional broad spectrum transfection
- Cutting edge delivery of plasmid DNA and/or small RNAs (siRNA, miRNA, and CRISPR guide RNA)
- Outperforms Lipofectamine® 2000 in 28 of 41 tested cell lines

TransIT Certified Transfection

"I was recently tasked with developing a CRISPR protocol for primary and bone-derived cell lines. *Trans*IT-X2® Dynamic Delivery System was simple to use, 2-3 times better for transfection and much gentler on my cells than other products! I feel I have hit the jackpot and have already passed this exciting information on to my colleagues."

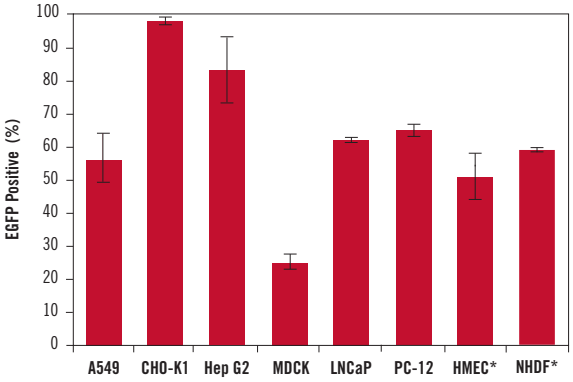
Dr. Joshua Chou,
Harvard School of Dental Medicine



‡ Cell types with >2-fold luciferase expression in head-to-head comparisons.

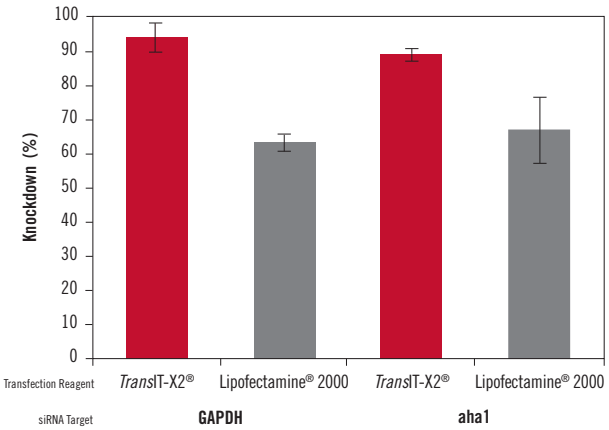
The *Trans*IT-X2® Dynamic Delivery System Enables Superior Gene Expression in a Variety of Cell Types. *Trans*IT-X2® Dynamic Delivery System (Mirus Bio) and Lipofectamine® 2000 Transfection Reagent (Thermo Fisher Scientific) were used to transfect plasmid DNA encoding luciferase into 41 different cell types at three reagent-to-DNA ratios. Luciferase expression was compared at 24 hours post-transfection using a standard luciferase assay.

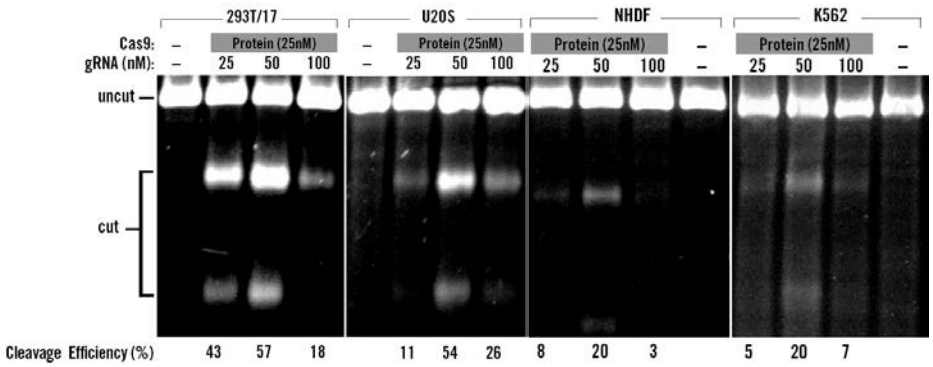
*Trans*IT-X2® Dynamic Delivery System *continued*



High GFP Transfection Efficiency in Multiple Cell Lines and Primary Cells Using *Trans*IT-X2® Dynamic Delivery System. *Trans*IT-X2® (Mirus Bio) was used to transfect plasmid DNA encoding EGFP into the indicated cell lines. Transfections were performed in 96-well plates using 0.2-0.4 µl of *Trans*IT-X2® (Mirus Bio) to deliver 0.1 µg of DNA. Triplicate wells were assayed 48 hours post-transfection.

_Trans_IT-X2® Dynamic Delivery System Achieves Higher siRNA Knockdown than Lipofectamine® 2000. *Trans*IT-X2® (Mirus Bio) and Lipofectamine® 2000 (Thermo Fisher Scientific) were used to transfect siRNA targeting endogenous proteins – GAPDH and AHA1 in normal human dermal fibroblasts (NHDF). Cells were transfected in a 6-well plate using 4 µl of *Trans*IT-X2® (Mirus Bio) or 6 µl of Lipofectamine® 2000 (Thermo Fisher Scientific) and 25 nM siRNA according to each manufacturer's protocol.





Genome Editing with Cas9 + Guide RNA Ribonucleoprotein Complexes. The RNP complex of PPIB targeting two-part gRNA (Dharmacon) and Cas9 protein (PNA Bio) was delivered into multiple cell lines using *Trans*IT-X2® (Mirus Bio). A T7E1 mismatch detection assay was used to measure cleavage efficiency at 48 hours post-transfection.

Low Toxicity Transfection Reagents

Choosing a reagent that balances efficient nucleic acid delivery and low cellular toxicity is important to achieving consistent experimental outcomes. Mirus Bio developed *Trans*IT®-LT1 and *Trans*IT®-2020 transfection reagents to find this balance in a wide range of cell lines.

To determine the best reagent for your experiment, view citations, customer feedback and in-house transfection data, utilize the Reagent Agent Transfection Database. See Page 8 for more details

*Trans*IT®-LT1 Transfection Reagent

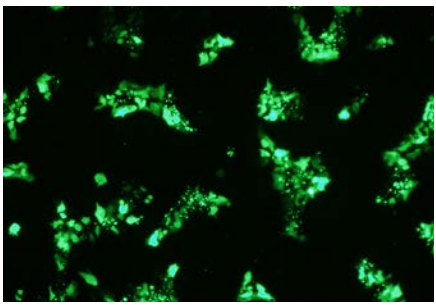
Designated "LT" for its low toxicity, *Trans*IT®-LT1 has been the preferred reagent for researchers seeking a gentle and reliable solution for more than 20 years.

- High efficiency, low toxicity transfections
- Utilize one reagent and protocol for a wide range of cell lines
- Deliver single or multiple plasmids

TransIT Certified Transfection

I recently tested *Trans*IT®-2020 and *Trans*IT®-LT1, and both reagents worked well in terms of their efficiency at transfecting human-derived iPS cells with CRISPR constructs and a fluorescent protein reporter. Through visual inspection, transfection efficiencies with *Trans*IT®-2020 and *Trans*IT®-LT1 were clearly higher than with Lipofectamine® 3000.

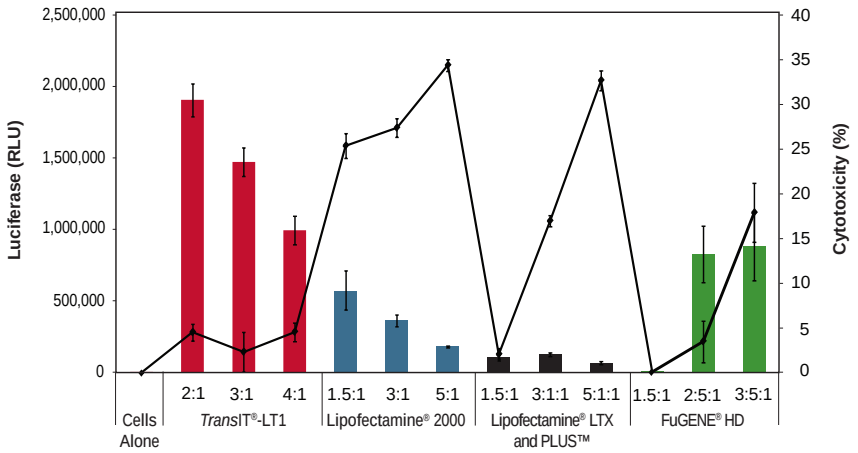
Fedir Kiskin,
University of Cambridge



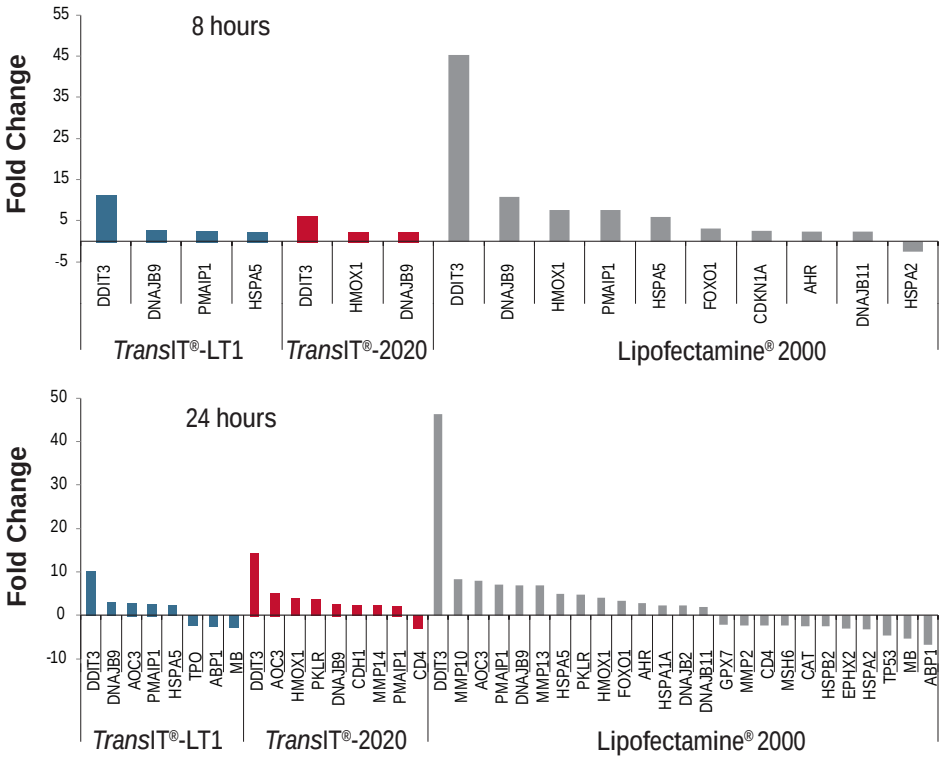
Exceptional Transfection Efficiency in Human Induced Pluripotent Stem Cells (iPSCs) via Reverse Transfection with *Trans*IT®-LT1. The *Trans*IT®-LT1 Transfection Reagent (Mirus Bio) was used to reverse transfect 1.3 x 10^6 iPS cells with a ZsGreen expressing plasmid (Clontech). Reverse transfections were performed in 6-well plates using 12 µl of *Trans*IT®-LT1 (Mirus Bio) to deliver 4 µg of DNA (3:1, reagent: DNA). Cells were visualized 48 hours post-transfection.

Data courtesy of: Cellular Dynamics international, a FUJIFILM company

*Trans*IT®-LT1 Transfection Reagent *continued*



***Trans*IT®-LT1 Reagent Exhibits Higher Expression and Lower Cellular Toxicity Compared to Other Transfection Reagents.** HepG2 cells were transfected with a luciferase expression plasmid using the designated reagents at the manufacturer's recommended reagent-to-DNA ratio indicated beneath each bar. Transfections were performed in 96-well plates using 0.1 µg of plasmid DNA per well. Luciferase expression (bar graph) and lactate dehydrogenase (LDH) levels (line graph) were measured at 24 hours post-transfection. FuGENE® is a registered trademark of Fugent LLC.



***Trans*IT® Transfection Reagents Minimize the Stress Response in Transfected HeLa Cells.** Stress-related gene expression changes were determined by RT-qPCR from total RNA samples harvested from HeLa cells that were transfected with *Trans*IT®-LT1 (Mirus Bio), *Trans*IT®-2020 (Mirus Bio) or Lipofectamine® 2000 (Thermo Fisher Scientific) at 8 and 24 hours. Eighty-four genes were analyzed using the Human Stress Response 96 StellARray™ (Lonza Group, Ltd.).

Delivery by Mirus

*Trans*IT®-2020 Transfection Reagent

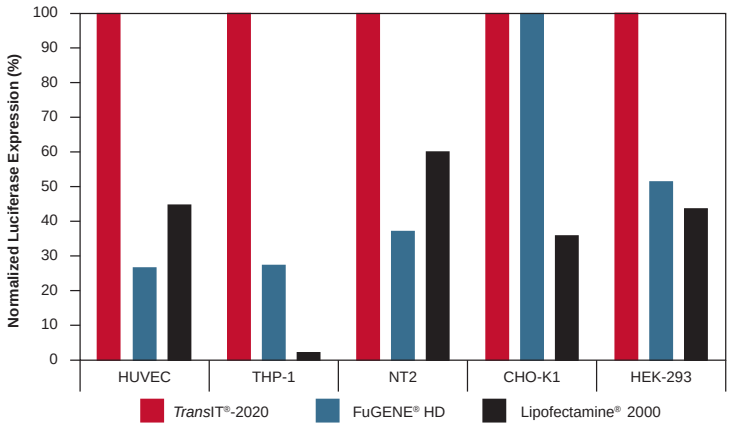
A unique DNA broad spectrum reagent that enables high expression in many cell types, including a subset that are typically resistant to chemical transfection.

- Achieve high expression in many cell types, including HUVEC, THP-1, and MEF
- Balance high efficiency nucleic acid deliver and low cellular toxicity
- Animal origin free formulation

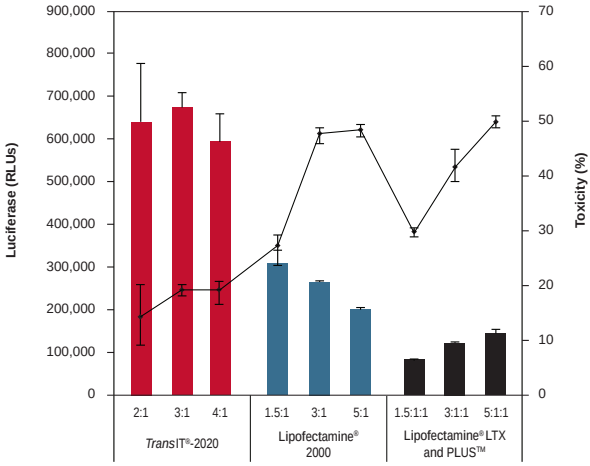
TransIT Certified Transfection

...We have been able to transfect BMDM's with the *Trans*IT®-2020 Transfection Reagent. Not only are my cells healthier, but I get good expression, and it is more cost effective to the Neon® Transfection System that my lab traditionally uses. I have also been able to share these results with others that are now trying it with great success. It makes me look like a hero!

Jeffrey Fay,
Hoffman Lab, University of Hawaii at Manoa



Superior Gene Expression in a Broad Spectrum of Cell Types with *Trans*IT®-2020. The indicated cell types were transfected in 96-well plates with a luciferase expression plasmid (0.1 µg/well) according to industry accepted testing protocols. Reagent to DNA ratios were optimized for each cell type: *Trans*IT®-2020 (Mirus Bio, 2:1 or 3:1), FuGENE® HD (Fugent LLC, 3.5:1), Lipofectamine® 2000 (Thermo Fisher Scientific, 1.5:1, 3:1 or 5:1). Values were normalized to *Trans*IT®-2020 (Mirus Bio) and presented as a percentage of luciferase expression. FuGENE® is a registered trademark of Fugent LLC.



***Trans*IT®-2020 Exhibits Higher Expression and Lower Cellular Toxicity Compared to Other Transfection Reagents.** Human umbilical vein endothelial cells (HUVEC) were transfected with a luciferase expression plasmid using the designated reagents at the reagent-to-DNA ratios indicated beneath each bar. Transfections were performed in 96-well plates using 0.1 µg of plasmid DNA per well. Luciferase expression (bar graph) and lactate dehydrogenase (LDH) levels (line graph) were measured at 24 hours post-transfection.

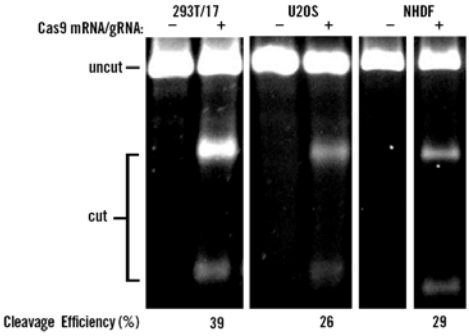
*Trans*IT®-mRNA Transfection Reagent

A high efficiency, low toxicity transfection reagent for large RNA and CRISPR guide RNA delivery.

- Ideal for specialized applications, such as virus production, protein expression and CRISPR/Cas9 genome editing
- Achieve RNA delivery in a large population of cells to ensure experimental success
- Perform transfections in the presence of serum, which eliminates the need for a media change

Our lab recently used the *Trans*IT®-mRNA Transfection Kit to show that intracellular delivery of HPLC-purified and pseudouridine-containing mRNA can translate very efficiently without immune activation which is ideal for mRNA-based gene therapy applications. *Trans*IT®-mRNA further facilitated this work through low toxicity transfections of HEK 293T, human dendritic cells (DCs) and primary keratinocytes.

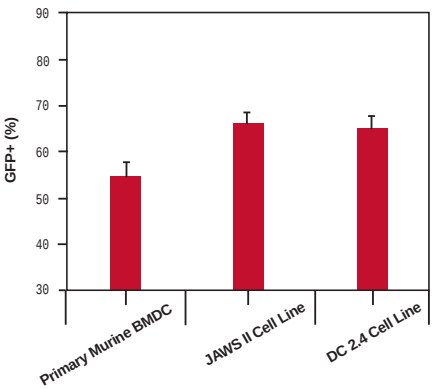
Dr. Katalin Karikó, Department of Neurology, University of Pennsylvania

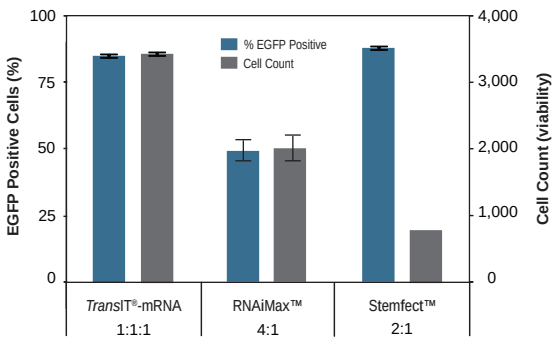


Efficient Genome Editing with Cas9 mRNA + gRNA Oligonucleotides. Indicated cell types were co-transfected with 0.5 µg of Cas9 encoding mRNA, 5meC, ψ (Trilink Biotechnologies) and 25nM of PPIB targeting 2-part gRNA (Dharmacon) using *Trans*IT®-mRNA Transfection Kit (0.5 µl/well of 24-well plate of both mRNA Reagent and Boost, Mirus Bio). A T7E1 mismatch detection assay was used to measure cleavage efficiency at 48 hours post-transfection.

Multiple Dendritic Cell Types Express GFP from mRNA Transfection using *Trans*IT®-mRNA Transfection Kit. Murine primary bone marrow derived dendritic cells (BMDC) and murine dendritic cells types (JAWS II and DC 2.4) were transfected with 1 µg of capped and polyadenlyated mRNA encoding GFP using a *Trans*IT®-mRNA Reagent: Boost: mRNA ratio of 1:1:1 (µl:µl:µg) (Mirus Bio).

Data courtesy of Kyle Phua
(Principal Investigator: Kam W. Leong), Duke University.





High Efficiency and Low Toxicity Transfection Following 14 Consecutive Transfections with *Trans*IT®-mRNA Transfection Kit. Repeated daily transfections were performed in the same population of BJ fibroblasts using *Trans*IT®-mRNA Transfection Kit (Mirus Bio), Lipofectamine® RNAiMAX (Thermo Fisher Scientific) and Stemfect™ RNA Transfection Kit (Stemgent).

Delivery by Mirus

	*Trans*IT-X2®*	*Trans*IT®-LT1	*Trans*IT®-2020*	*Trans*IT®-mRNA*
Plasmid DNA	●●●	●●○	●●○	○○○
siRNA	●●●	○○○	○○○	○○○
Cas9 RNP	●●●	**	**	**
CRISPR gRNA	●●●	○○○	○○○	●●○
Low Cellular Toxicity	●●○	●●●	●●○	●●●
DNA Virus Production	●○○	●●●	●●●	○○○
mRNA, Viral RNA	○○○	○○○	○○○	●●●

***Animal origin free formulation**
****Reagent not yet tested for delivery of Cas9 RNP**

Broad Spectrum Transfection Reagents

PRODUCT	DESCRIPTION	PRODUCT NO.	QUANTITY
*Trans*IT-X2® Dynamic Delivery System 	The premier reagent from Mirus Bio: *Trans*IT-X2® is an advanced system for delivery of plasmid DNA, siRNA/miRNA and CRISPR/Cas9 components to mammalian cells.	MIR6003	0.3 ml
		MIR6004	0.75 ml
		MIR6000	1.5 ml
		MIR6005	5 x 1.5 ml
		MIR6006	10 x 1.5 ml
*Trans*IT®-LT1 Transfection Reagent 	A broad spectrum, very low toxicity, DNA transfection reagent for mammalian cells.	MIR2304	0.4 ml
		MIR2300	1 ml
		MIR2305	5 x 1 ml
		MIR2306	10 x 1 ml
*Trans*IT®-2020 Transfection Reagent 	A high performance, animal-origin-free, broad spectrum DNA transfection reagent for mammalian cells.	MIR5404	0.4 ml
		MIR5400	1 ml
		MIR5405	5 x 1 ml
		MIR5406	10 x 1 ml
*Trans*IT®-mRNA Transfection Kit 	A high efficiency, low toxicity, transfection reagent for large RNA and CRISPR guide RNA	MIR2225	0.4 ml
		MIR2250	1 ml
		MIR2255	5 x 1 ml
		MIR2256	10 x 1 ml

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